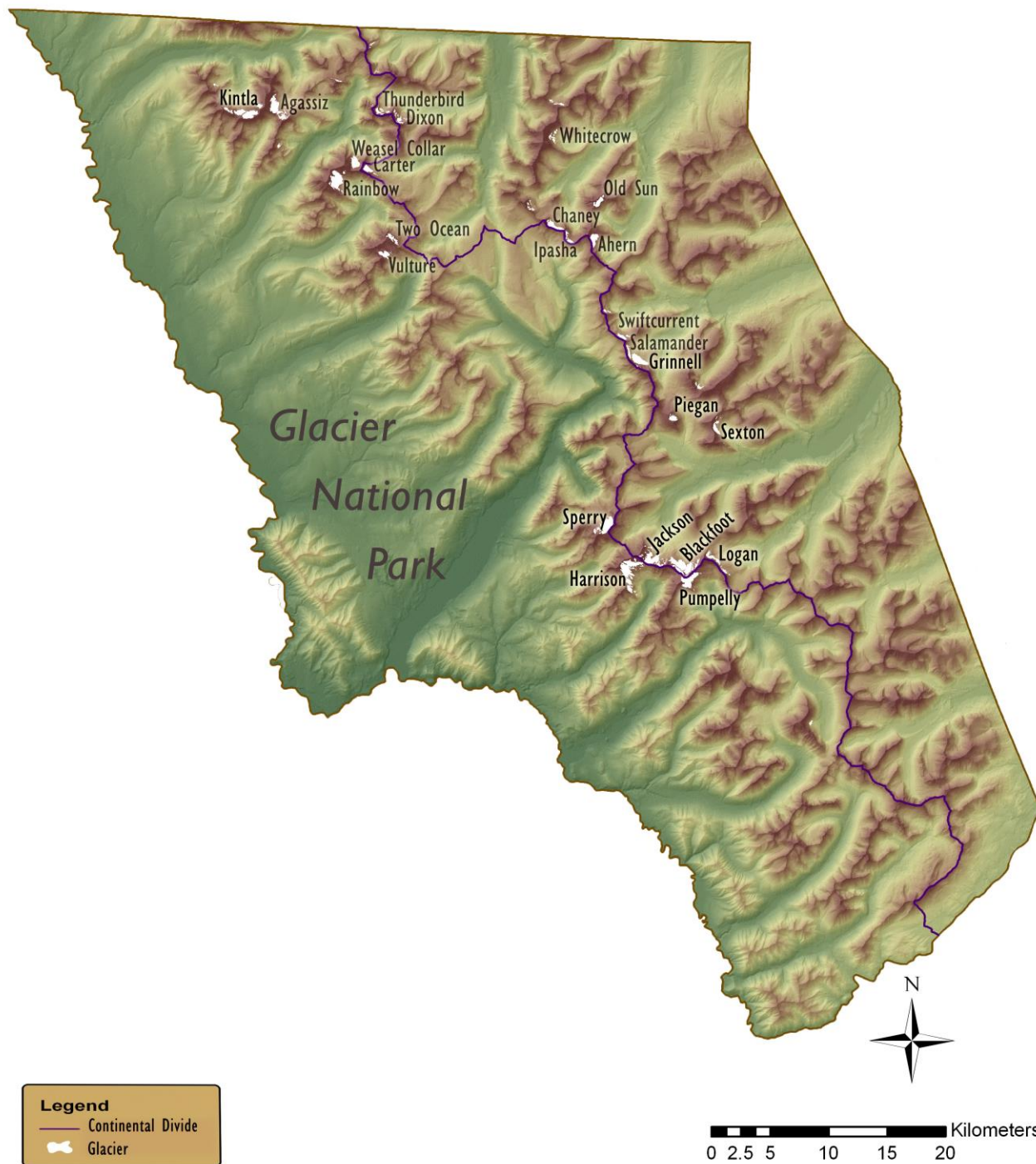




Thinking about Trails and Habitat in an era of Climate Change: Addendum

Jay Chamberlin
Natural Resources Division
California State Parks



Northern Rocky Mountain
Science Center (NOROCK),
US Geological Survey



Boulder Glacier, August 5, 1913
W C Alden, USGS Photographic Library

WC Alden photo courtesy of Glacier
NP archives

Boulder Glacier 1913



Boulder Glacier, Sept 6, 2012
Kevin Jacks, USGS

Kevin Jacks photo courtesy of USGS

Boulder Glacier 2012



*Grinnell Glacier, 1911
Stanton photo, USGS*

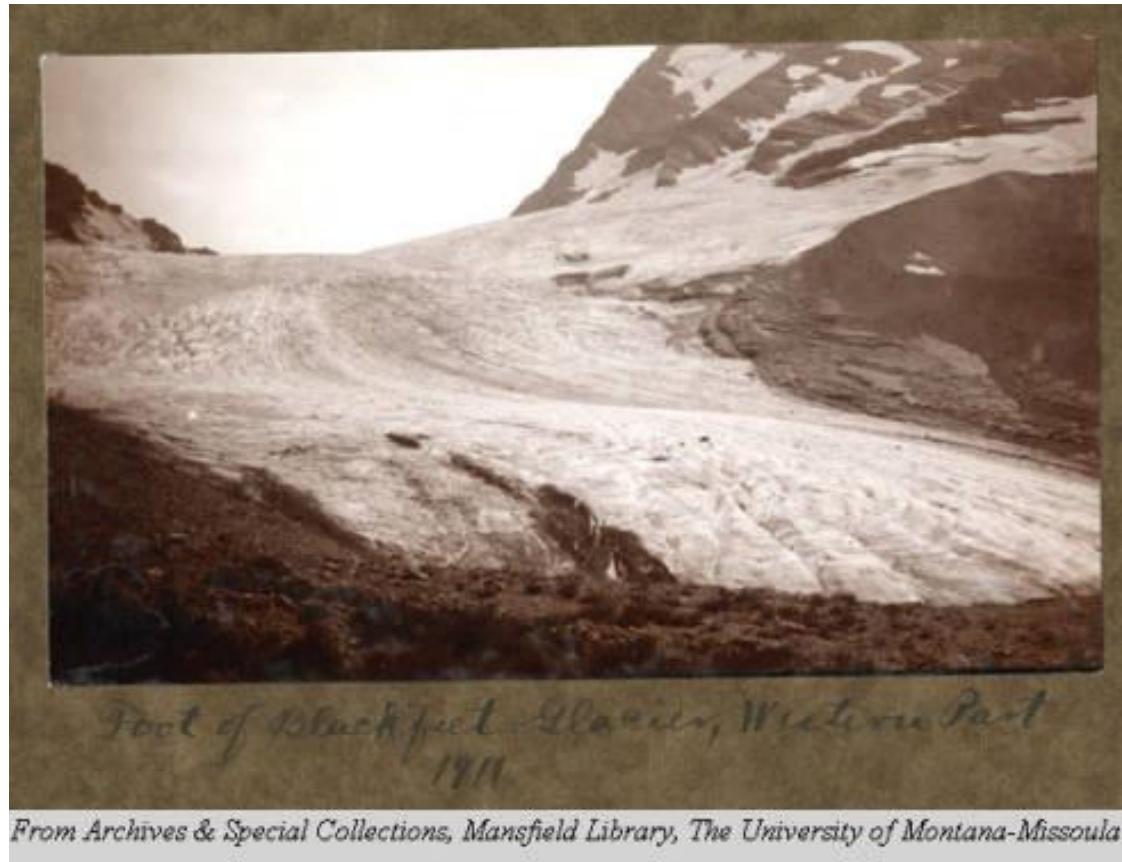
Stanton photo courtesy of Glacier NP
Archives

Grinnell Glacier 1911



Grinnell Glacier, 2008
Lisa McKeon photo, USGS

Lisa McKeon photo Courtesy of USGS



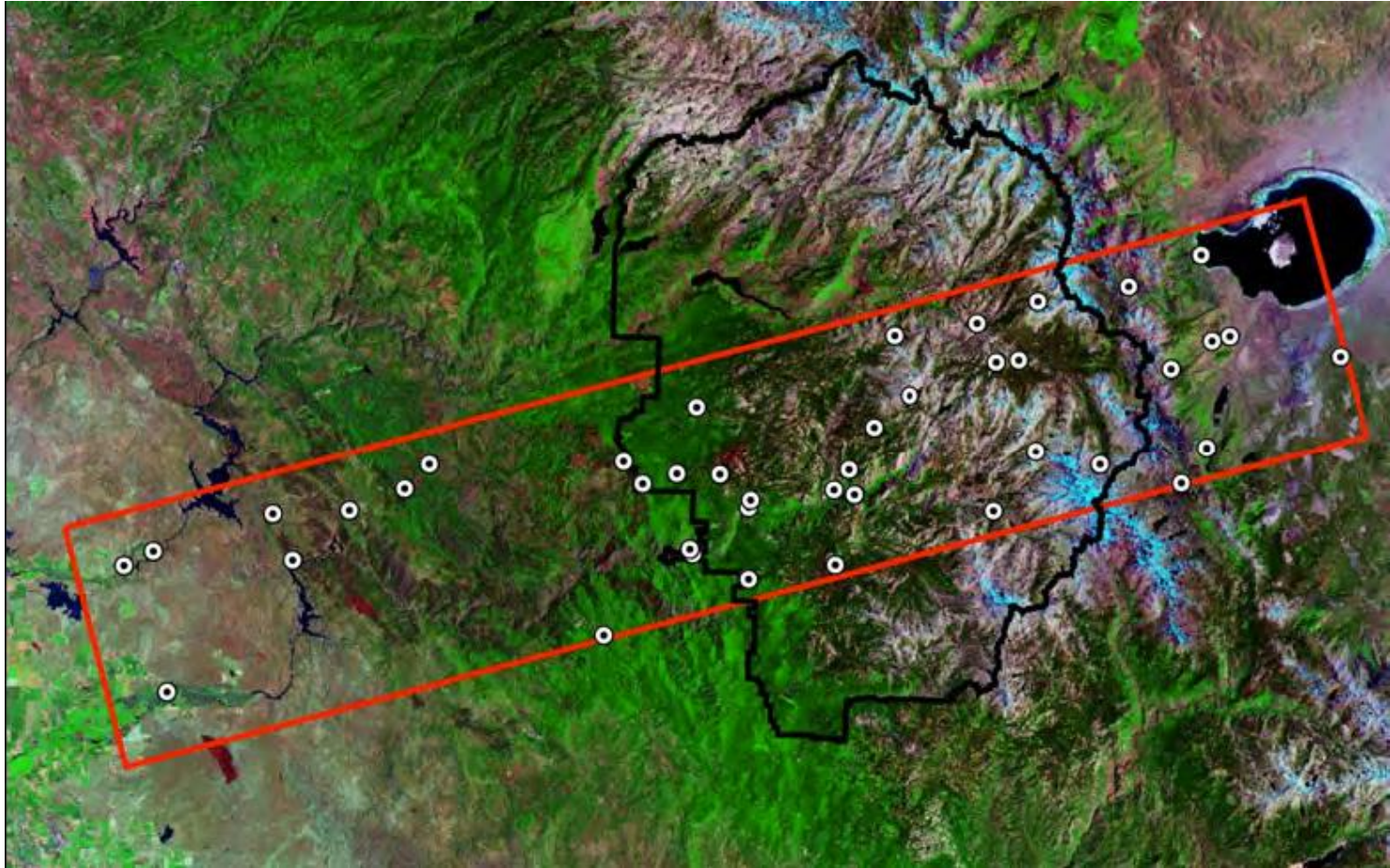
From Archives & Special Collections, Mansfield Library, The University of Montana-Missoula

Morton Elrod Photo Courtesy of K
Ross Toole Archives, University of
Montana



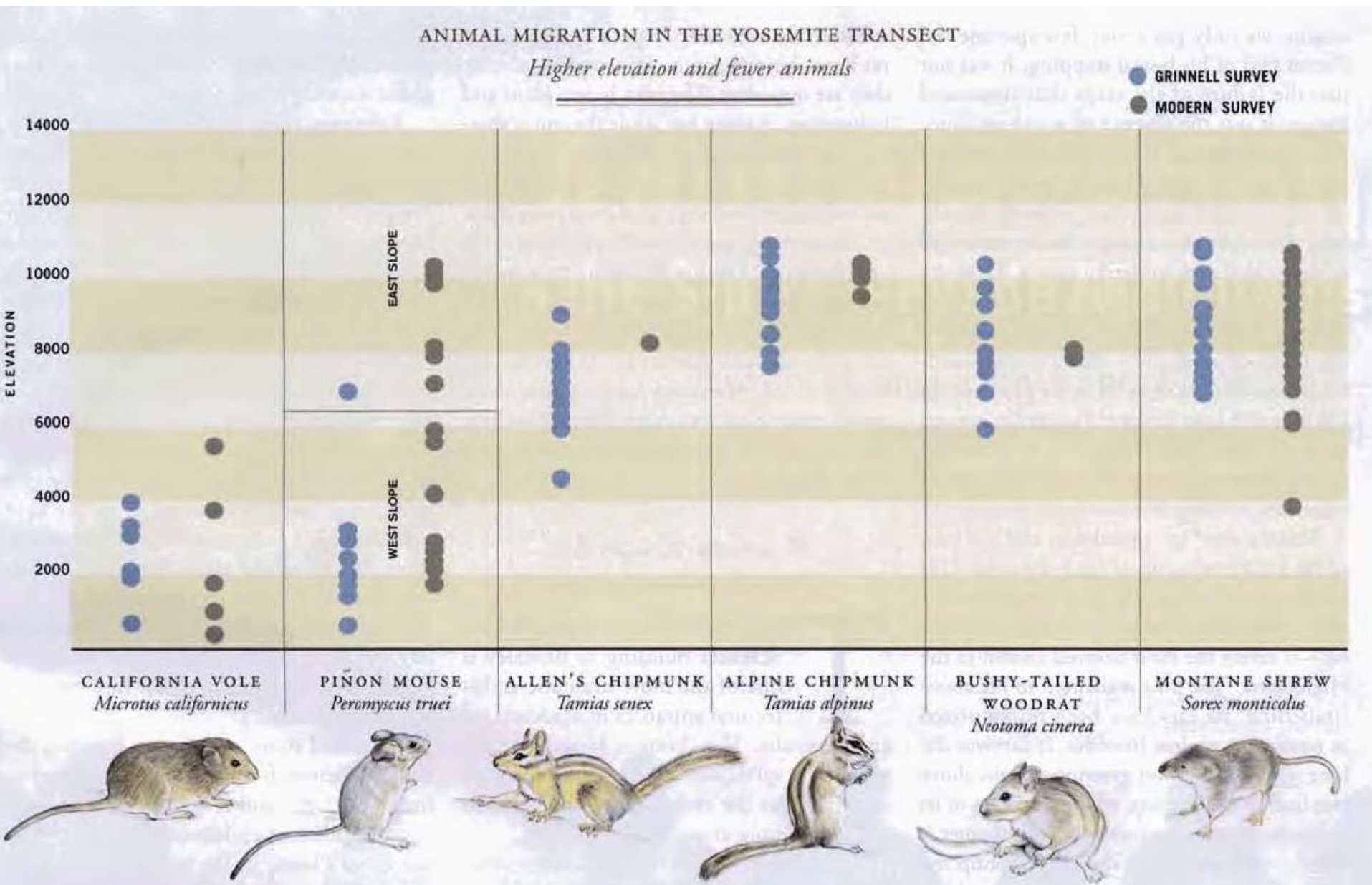
Lisa McKeon photo Courtesy of USGS

Grinnell Yosemite Resurvey Project



Moritz et al. 2002-2004

Grinnell Yosemite Resurvey Project



Sequoia-dendron giganteum



Courtesy Save the Redwoods League



Calaveras Big Trees State Park



Stephen Sillett, Institute for Redwood Ecology, Humboldt State University

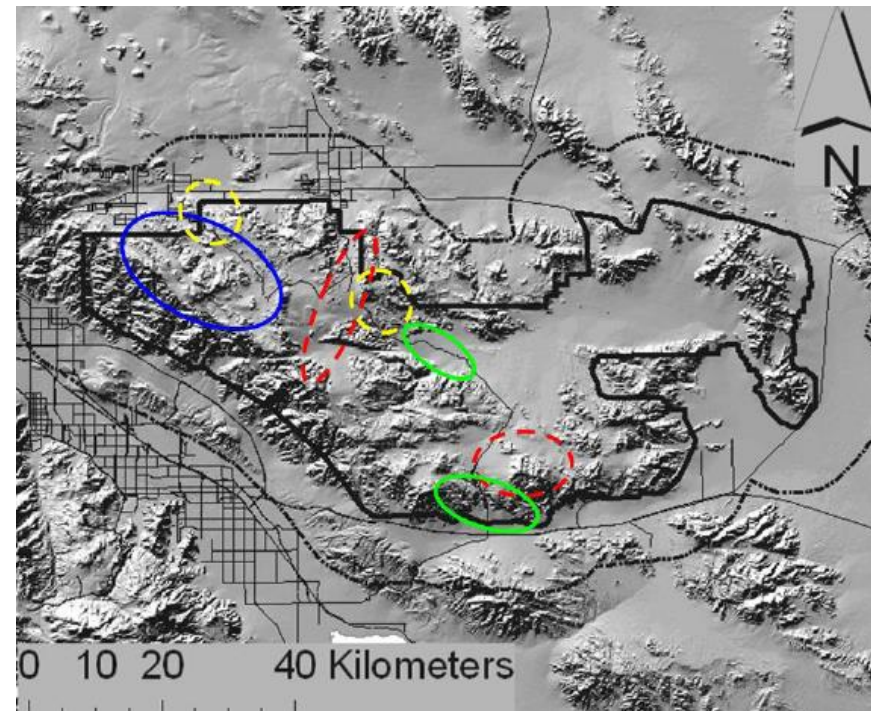
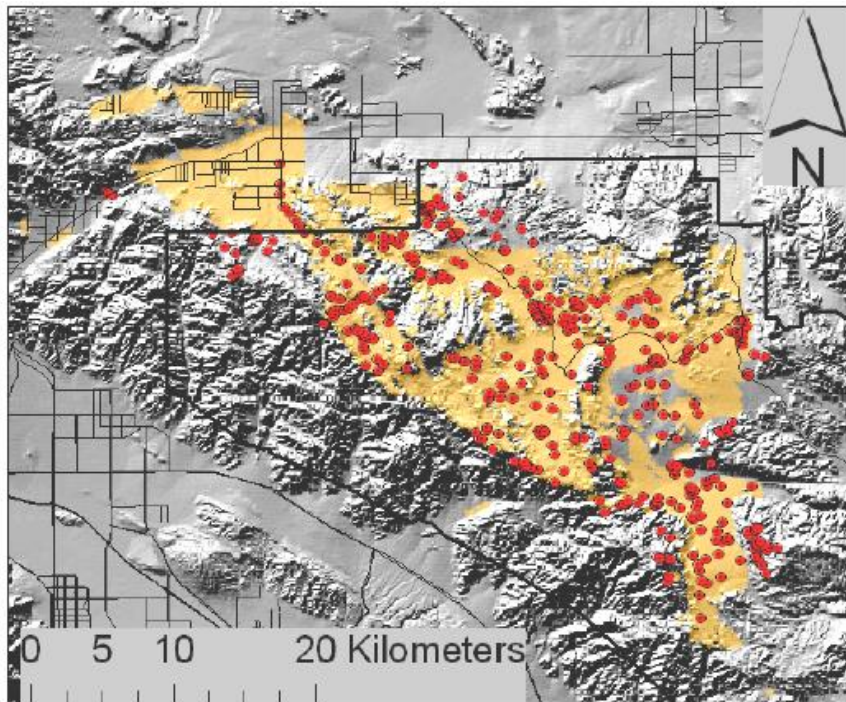


Joshua Tree

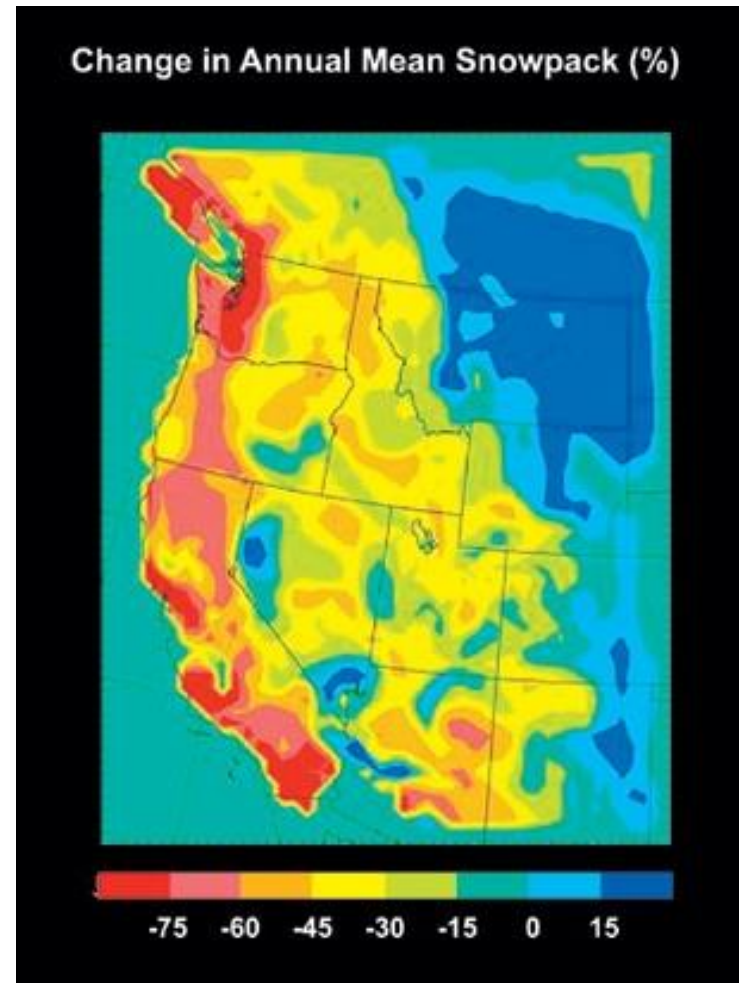
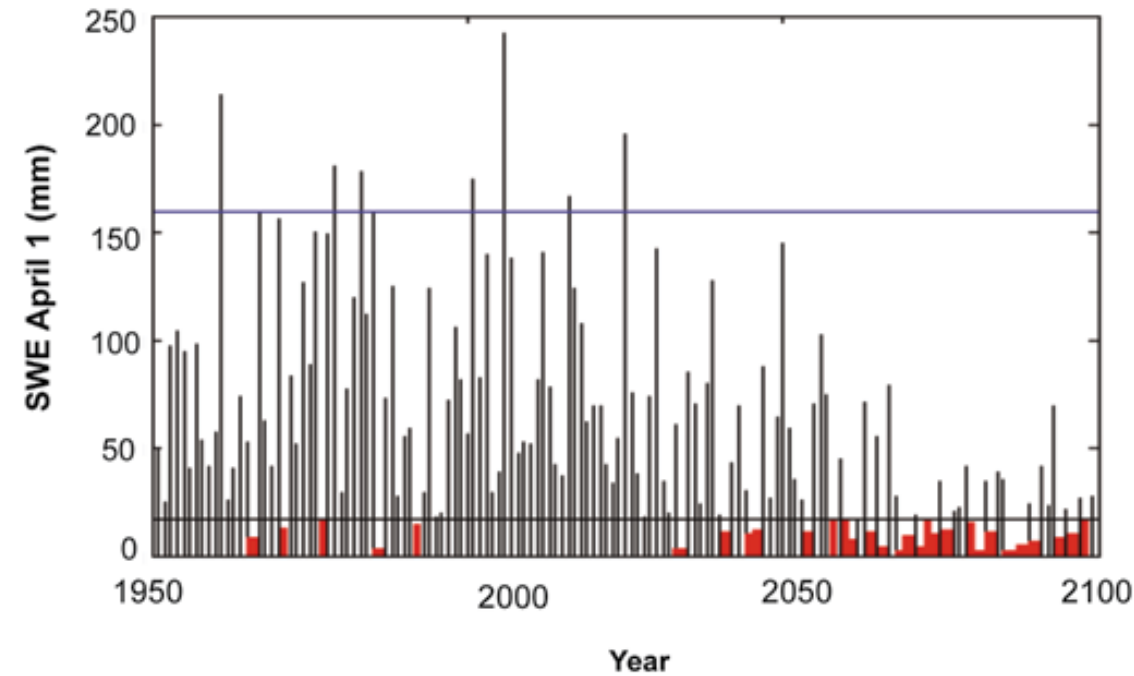


Joshua Trees endangered in Joshua Tree NP?

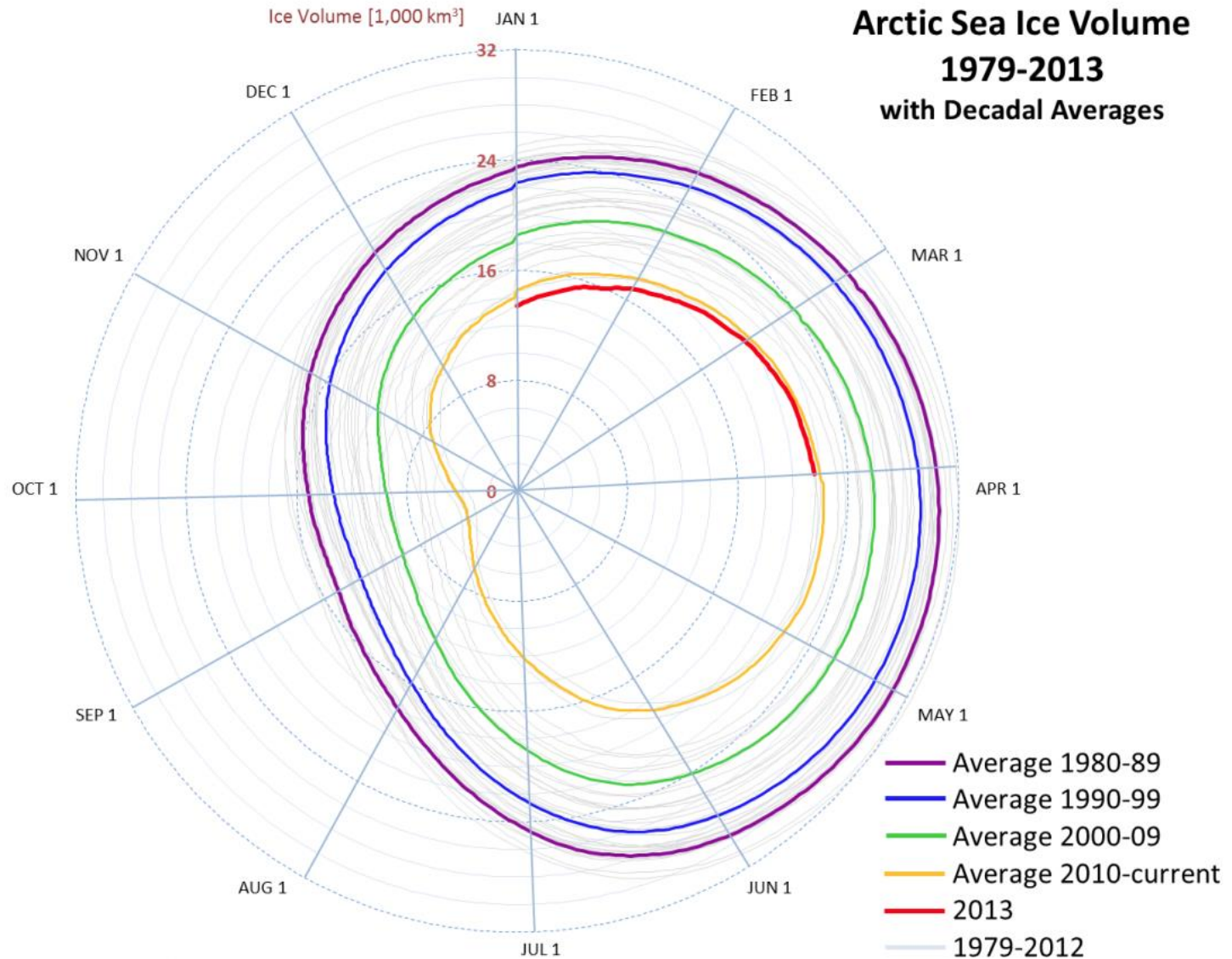
Species	Current Extent (ha)	+1°C Shift	+2°C Shift	+3°C Shift
<u>Mojave Desert Affiliation</u>				
<i>Yucca brevifolia</i>	30,380	21,068 (69%)	9,344 (31%)	28 (>1%)



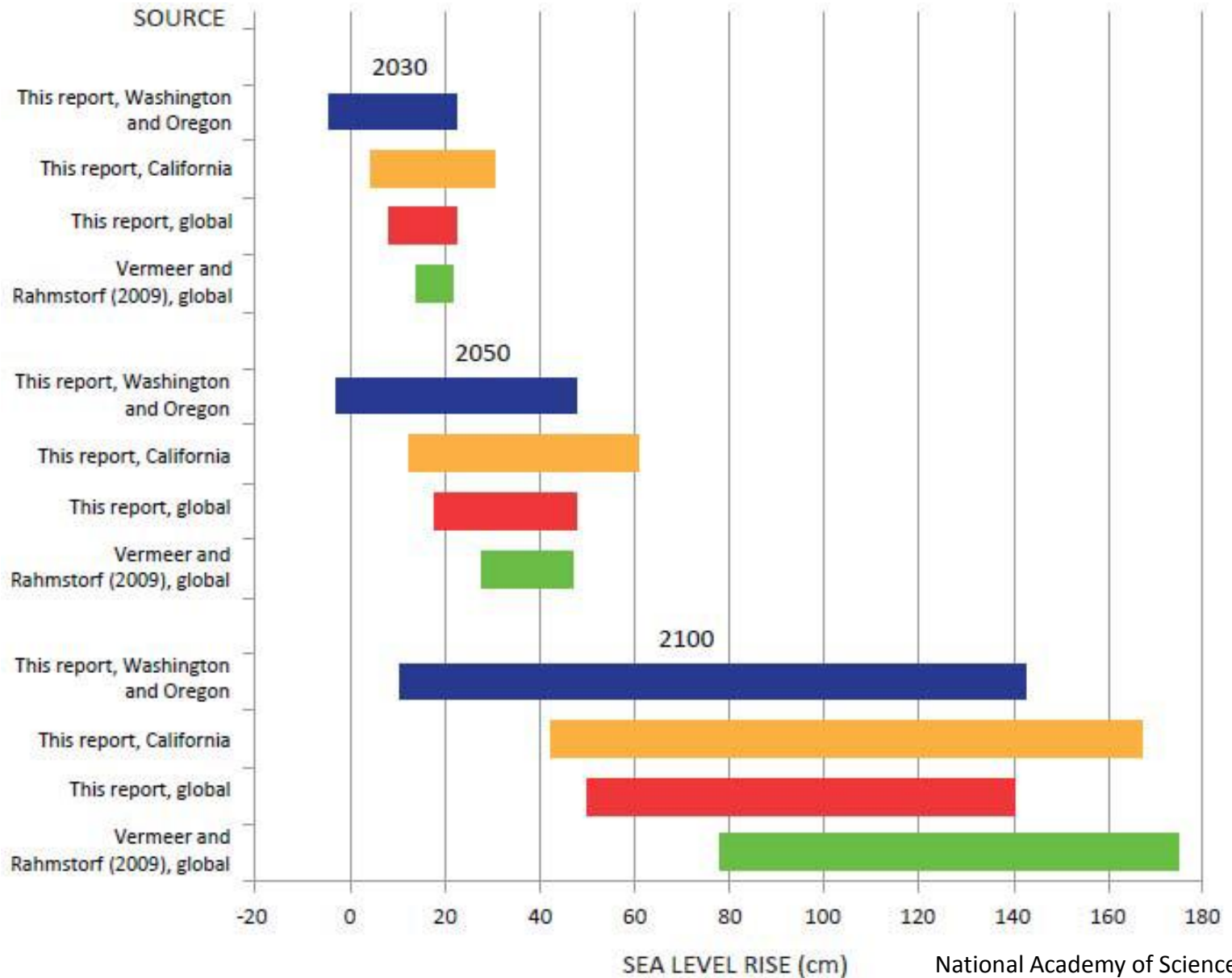
Modeling the Future: Sierra Nevada Snowpack



Arctic Sea Ice



Sea Level Rise





Sea Level Rise & Storm Surge Models



Silver Strand SB

+ 55 inch SLR & 100-year storm event



Malibu Lagoon SP

+ 55 inch SLR & 100-year storm event

Preliminary Results: SLR Vulnerability

	Very High	Moderate	Low
Model Agreement	Moss Landing SB Santa Monica SB Half Moon Bay SB Mandalay SB Zmudowski SB Salinas River SB	Año Nuevo SNR Harry A. Merlo SRA Humboldt Lagoons SP Torrey Pines SNR Estero Bluffs SP South Carlsbad SB	Rob H. Meyer SB Trinidad SB Point Dume SB Point Lobos SNR John Little SNR Cardiff SB
Model Disagreement	Bolsa Chica SB Huntington SB Torrey Pines SB Morro Strand SB San Buenaventura Pescadero SB Monterey SB Border Field SP	Schooner Gulch SB Moonlight SB San Gregorio SB Seacliff SB McGrath SB Pismo SB Thornton SB ...	Andrew Molera SB Leo Carrillo SP Garrapata SP Limekiln SP Del Norte Coast SP Julia Pfeiffer Burns SP Crystal Cove ...



National Park Service

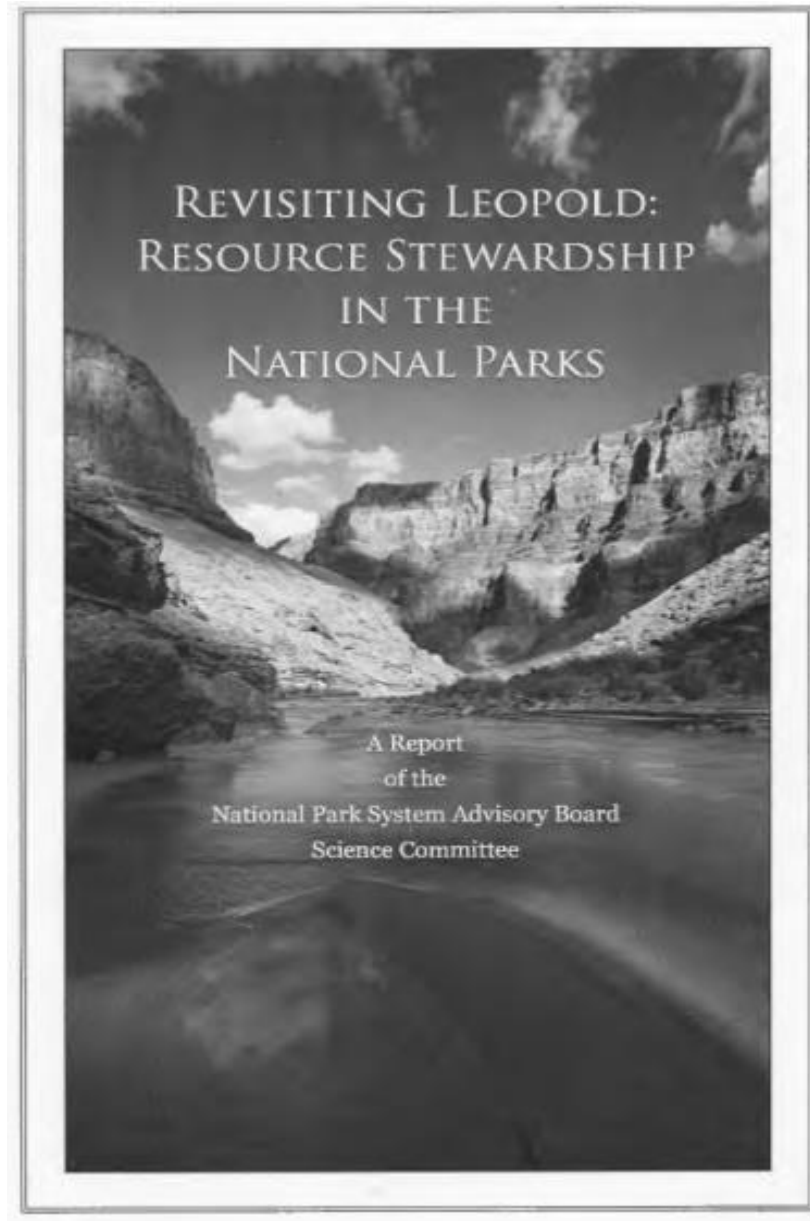
1963

As a primary goal, we would recommend that the biotic associations within each park be maintained, or where necessary recreated, as nearly as possible in the condition that prevailed when the area was first visited by the white man. A national park should represent a vignette of primitive America.

Wildlife Management in the National Parks, S Leopold et al

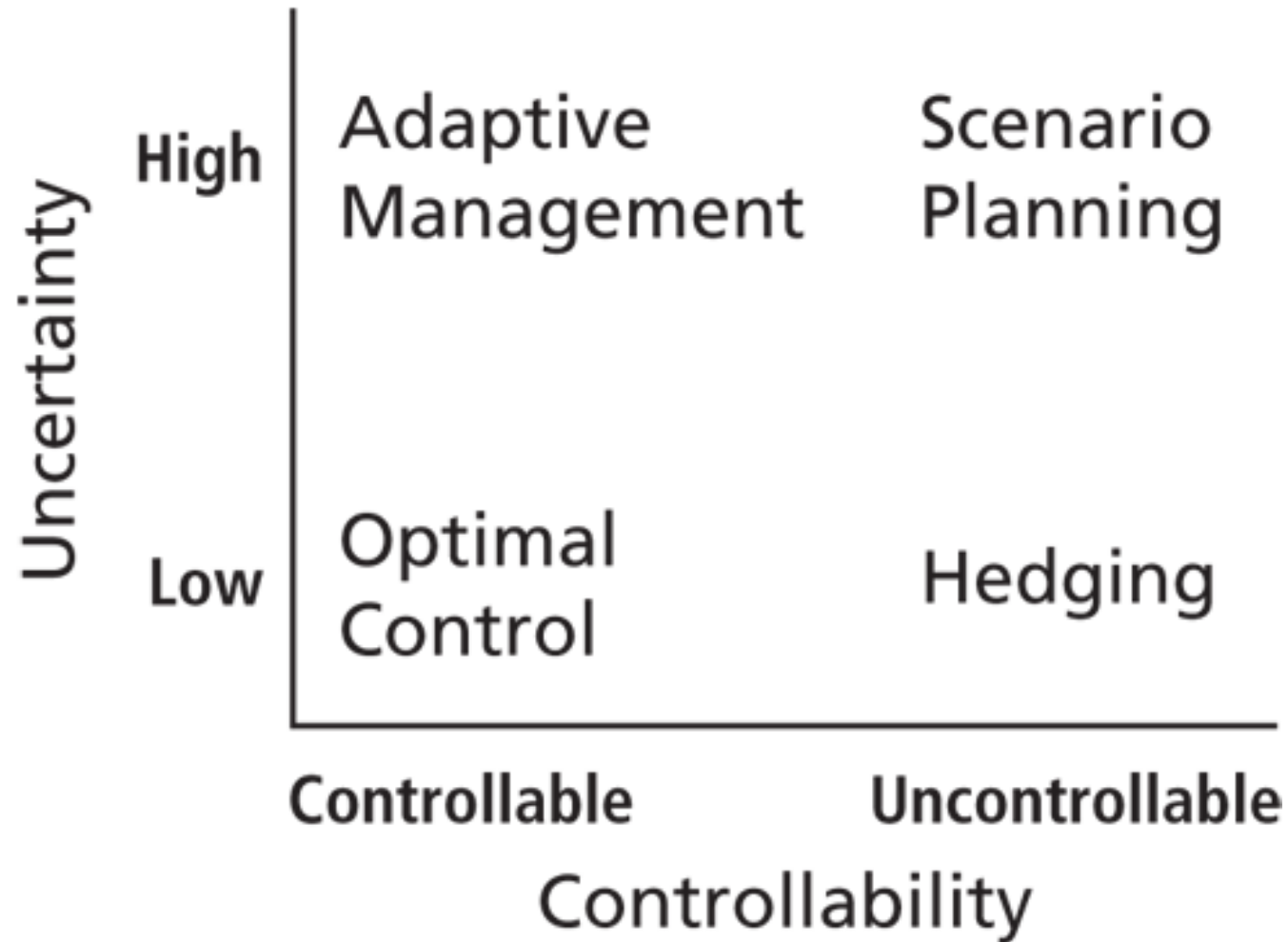
National Park Service 2012

The overarching goal of NPS resource management should be to steward NPS resources for continuous change that is not yet fully understood, in order to preserve ecological integrity and cultural and historical authenticity, provide visitors with transformative experiences, and form the core of a national conservation land- seascape.



Big Questions for the Future

- What actions are appropriate in the face of uncertainty?
- How can we cooperate across our internal silos?
- How can we cooperate across boundaries?
- What policies need to change?



Extreme Weather & Catastrophic Events



Menahem Kahana/Agence France-Presse, Getty Images



Mark Wilson, Getty Images

Climate Change “Debate”

